In the Claims

1. **(Canceled)**
2. **(Canceled)**
3. **(Canceled)**
4. **(Canceled)**

5. **(Previously presented)** A microfluidic optical system comprising:

a light source;

a light receiver;

a microfluidic device for altering, by light-fluid interaction, the nature of a light beam emitted by the light source, the device having a window that is substantially transmissive of a desired light spectrum and containing a plurality of fluids behind the window, the window being disposed in an optical path between the light source and the light receiver to permit light-fluid interaction;

means for repeatedly manipulating the proportion of at least one of the plurality of fluids optically disposed between the light source and light receiver, wherein the manipulation affects reflection, refraction, absorption, optical filtering, or scattering of the light beam by at least one of the plurality of fluids; and

a mixer for substantially mixing at least two of the plurality of fluids, wherein the light beam interacts with the resulting mixture.

6. **(Canceled)**

7. **(Previously presented)** A microfluidic optical system comprising:

a light source;

a light receiver;

a microfluidic device for altering, by light-fluid interaction, the nature of a light beam emitted by the light source, the device having a window that is substantially transmissive of a desired light spectrum and containing a plurality of fluids behind the window, the window being disposed in an optical path between the light source and the light receiver to permit light-fluid interaction; and

means for repeatedly manipulating the proportion of at least one of the plurality of fluids optically disposed between the light source and light receiver, wherein the manipulation affects reflection, refraction, absorption, optical filtering, or scattering of the light beam by at least one of the plurality of fluids;

wherein the plurality of fluids includes a first fluid and a second fluid, the fluids being substantially immiscible and defining a discrete plug of the first fluid, and

wherein the manipulation means includes a deformable flexible member in fluid communication with the first fluid plug.

8. **(Original)** The system of claim 7 wherein the flexible member is deformed by means selected from the group consisting of: piezoelectric actuation, magnetic actuation, pneumatic actuation, thermoelectric actuation, and mechanical actuation.

9. **(Original)** The system of claim 7 wherein the first fluid and the second fluid are both liquids.

10. **(Previously presented)** The system of claim 5 wherein at least one of the plurality of fluids contains dissolved or suspended particles.

11. **(Canceled)**

12. **(Canceled)**

13. **(Previously presented)** A variable optical filter including the optical system of claim 5.

14. **(Previously presented)** An optical switching device including the optical system of claim 7.

15. **(Canceled)**

16. **(Canceled)**

17. **(Canceled)**

18. **(Canceled)**

19. **(Canceled)**

20. **(Cancelled)**

21. **(Currently amended)** The system of claim ~~20~~ 56 wherein the input source provides a monochromatic beam.

22. **(Canceled)**

23. **(Canceled)**

24. **(Previously presented)** A method for performing optical switching, the method comprising the steps of:

providing a first light source and a first light receiver;

providing an enclosed microfluidic channel containing a first fluid and a second fluid, the fluids being substantially immiscible and defining a discrete plug of the first fluid; and

manipulating the first fluid plug to selectively enable light emitted from the first light source to be received by the first light receiver;

wherein manipulation of the first fluid plug is performed by deforming a flexible member in fluid communication with the microfluidic channel.

25. **(Previously presented)** A method for performing optical switching, the method comprising the steps of:

providing a first light source and a first light receiver;

providing an enclosed microfluidic channel containing a first fluid and a second fluid, the fluids being substantially immiscible and defining a discrete plug of the first fluid;

providing a plurality of electrodes in electrical communication with at least one of the first fluid and the second fluid; and

supplying an electric potential to at least one electrode of the plurality of electrodes to induce an electrokinetic or electrophoretic pressure gradient within the microfluidic channel to manipulate the first fluid plug to selectively enable light emitted from the first light source to be received by the first light receiver.

26. **(Original)** The method of claim 24 wherein a fluid reservoir having a greater cross-sectional area than the microfluidic channel is in fluid communication with the microfluidic channel, and the flexible member is positioned adjacent to the reservoir.

27. **(Original)** The method of claim 24 wherein the flexible member defines a surface of the microfluidic channel.

28. **(Canceled)**

29. **(Canceled)**

30. **(Previously presented)** A method for performing optical switching, the method comprising the steps of:

providing a light source and a light receiver;

providing an enclosed microfluidic channel containing a fluid;

providing a deformable member in fluid communication with the channel, and

deforming the deformable member to displace at least a portion of the fluid contained in the microfluidic channel to selectively enable light emitted from the light source to be received by the light receiver;

wherein the fluid is substantially absorptive of at least a portion of the spectrum to be emitted from the light source, and the deformable member is substantially reflective of at least a portion of the spectrum to be emitted from the light source.

31. **(Canceled)**

32. **(Previously presented)** The method of claim 30 wherein the deformable member is deformed by piezoelectric actuation or magnetic actuation.

33. **(Previously presented)** An optical switching device utilizing the method of claim 30.

34. **(Canceled)**

35. **(Canceled)**

36. **(Previously presented)** A method for altering the nature of a light beam, the method comprising the steps of:

providing an enclosed microfluidic device having a chamber bounded by a deformable flexible membrane, the chamber containing fluid;

supplying a light beam to the microfluidic device in the direction of the flexible membrane; and

manipulating the pressure within the chamber, thereby deforming the flexible membrane and changing the amount of fluid present in the chamber;

wherein the flexible membrane is substantially reflective of a desired light spectrum and at least a portion of the light beam interacts with the membrane.

37. **(Canceled)**

38. **(Canceled)**

39. **(Canceled)**

40. **(Canceled)**

41. **(Canceled)**

42. **(Previously presented)** The system of claim 5 wherein the mixer is disposed within a fluidic mixing device.

43. **(Previously presented)** The system of claim 42 wherein the fluidic mixing device includes a microfluidic channel.

44. **(Previously presented)** The system of claim 43 wherein the fluidic mixing device includes a substantially planar stencil layer, the microfluidic channel being defined through the entire thickness of the stencil layer.

45. **(Previously presented)** The system of claim 42 wherein the mixer is adapted to laminate a first fluid of the plurality of fluids in a first fluidic layer in contact with a second fluid of the plurality of fluids in a second fluidic layer.

46. **(Previously presented)** The system of claim 5 wherein the light source has an associated first fiber optic conduit and the light receiver has an associated second fiber optic conduit.

47. **(Previously presented)** The system of claim 5, further comprising a plurality of fluidic inputs for supplying the plurality of fluids to the microfluidic device.

48. **(Previously presented)** The system of claim 5 wherein the manipulating means includes a flow control device that permits the flow rate of at least one fluid of the plurality of fluids to be varied.

49. **(Previously presented)** The system of claim 5 wherein the manipulating means includes at least one pump.

50. **(Previously presented)** The system of claim 5 wherein the microfluidic device comprises a flow-through cell through which the plurality of fluids flow substantially continuously.

51. **(Previously presented)** The system of claim 5 wherein the plurality of fluids includes at least three fluids.

52. **(Previously presented)** The system of claim 5 wherein the plurality of fluids are all liquids.

53. **(Previously presented)** The system of claim 7 wherein the flexible member comprises a polymeric material.

54. **(Previously presented)** The system of claim 7 wherein the microfluidic device comprises a plurality of substantially planar device layers including a stencil layer having a microfluidic channel defined through the entire thickness of the stencil layer.

55. **(Previously presented)** The system of claim 7 wherein at least one of the plurality of fluids contains dissolved or suspended particles.

56. **(Currently amended)** ~~The system of claim 20 wherein~~ An optical processing system comprising:

an input light source;

an input coupler for receiving light from the input light source;

an output coupler for providing light to an output device;

a microfluidic optical device for manipulating light, the microfluidic optical device ~~comprises~~ comprising a plurality of substantially planar device layers including a stencil layer having a microfluidic channel defined through the entire thickness of the stencil layer, the microfluidic optical device further being optically coupled between the input coupler and the output coupler;

an output device for receiving a beam from the output coupler;

a controller;

a power supply; and

a sensor, wherein the controller receives a feedback signal from the sensor.

57. **(Currently amended)** An optical switching device including the optical system of claim ~~20~~ 56.

58. **(Currently amended)** The system of claim ~~20~~ 56 wherein the sensor comprises at least one sensor.

59. **(Previously presented)** The system of claim 58 wherein the at least one sensor is disposed in sensory communication with the microfluidic optical device.

60. **(Previously presented)** The system of claim 58 wherein the at least one sensor is disposed in sensory communication with any of the input coupler and the output coupler.

61. **(Previously presented)** The system of claim 58 wherein the at least one sensor is disposed in sensory communication with any of the input light source and the output device.